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(54) Title of the article

Container for flowable substances with releasable inner lining

Title: Container for flowable substances with releasable inner lining

Description:

The invention relates to a container for storing and/or transport of flowable materials with a reclosable opening for filling and a reclosable outlet orifice, said container is equipped with a removable sack-shaped inner lining made of a thick film material.

In the technology of storing and transport, problems are growing due to environmental stipulations in regard to the disposal of transport containers which were filled with chemicals that can damage the environment. Another problem exists in the storage and/or transport of chemicals in containers where corrosion problems and/or permeation problems can arise.

In steel and plastic drums one has solved the disposal problem in a manner that one inserts a film sack on the inside where the film sack is shaped like the drum. The bung cover of the drum covers the film sack such that the inner wall of the container cannot come in contact with the chemicals. For a steel drum permeation problems do not occur anyway.

In the application of plastic drums or containers for certain application areas there is the demand to improve the unsatisfactory permeation rate of the plastic materials employed. It is known that these type of containers are manufactured, for economical reasons, from high molecular weight polyethylene. The disadvantage of this material exists in that a number of substances can diffuse through the container walls. For this reason these containers, for example vehicle gasoline tanks, are protected against permeation by sulfonation or fluorination. This post-treatment is extraordinarily costly and requires much effort for larger containers and for manufacturing reasons is limited to volume sizes up to a maximum of 200 to 300 l holding capacity. The post-treatment of plastics with the gases fluorine or sulfone additionally leads to significant environmental problems, because here one is dealing with strong poisons which again have to be decontaminated and whose safe handling during production is very difficult.

For smaller containers up to about 30 l volume size one has solved the permeation problems by co-extrusion methods, that means through a multi-layer construction, where to the carrier plastic material, for example polyethylene, a barrier layer, for example made of EVOH, was added. The production of this type of multi-layered container which generally has to be constructed from more than 3 to 5 layers, because between the carrier polyethylene layer a barrier layer has to be constructed with the aid of a bonding agent, is very costly. These type of co-extrusion machines are expensive and the method is sensitive and associated with a high scrap rate.

Large containers with a holding capacity of 600 to 1200 l, as they are being employed at an increasing rate in industry, cannot be produced by the previously mentioned method. Furthermore, these type of large containers have, in addition to a filling nozzle on the top side, they have an outlet connection in the base area. Here sealing problems occur, because it must be prevented that the container content comes into contact with the inner walls of the container by moving past the inner lining.

The objective of the invention is to improve a container of the type characterized at the beginning such that a reliable and tightly sealed closure is provided for the filling opening area just as for the area of the outlet opening.

This objective is solved in an inventive manner in that at least the outlet opening is formed by an outlet connection that is outwardly directed and that the sack-shaped inner lining is provided with a hose-type projection both in the area of the filling opening and in the area of the outlet opening, said projection is each fed to the outer side of the container and is secured to the outside in a sealed manner. Through this here it is insured that the inner wall of the container is covered all the way into the filling area and the outlet area, and namely wraps around the edge of the opening by material of the removable inner lining such that the inner wall of the container cannot come into contact with the filled material. After emptying this type of container, the container can be disposed of by removing the inner lining such that the container is ready to be used again without an additional cleaning step simply by inserting a new inner lining. For the disposal it is important that through the configuration of the hose-shaped projections through a tight seal of the hose-shaped projection of the inner lining belonging to the outlet opening it is assured that when the inner lining is pulled out that remnants of the container contents cannot reach the container inner space and thus cannot get to the inner wall of the container.

In the embodiment of the invention it is provided that the hose-like projection that belongs to the fill opening is tightly connected on its free end to a reinforcing ring whose outer diameter is larger than the open width of the fill opening and the projection can be tightly sealed with the closure of the fill opening. The reinforcing ring forms here in conjunction with the container closure, for example, a screw cap which at the same time is the first seal, such that every leak of the closure is at the same time an indication that parts of the container contents can reach the space between the container inner wall and the inner lining.

In an additional advantageous embodiment of the invention it is provided that the hose-like projection of the inner lining that belongs to the outlet opening is designed to be able to be laid at least over the free front surface of the outlet connection. It is especially expedient in other embodiments of the invention that the outlet connection is provided with a sealing element in the area of its free end where the sealing element goes around the outlet connection and that clamps are provided which press the outer surface of the hose-like projection against the sealing element. Through this here it is assured on the one hand that when pulling out the inner lining through the fill opening that the hose-like projection that belongs to the outlet opening can be pulled back through the outlet opening towards the inside. An additional advantage exists in that the hose-like projection has, towards the outside, a free, sufficient length, this length allows the projection to be pinched off and thus allows a sealed closure of the inner lining prior to being pulled out of the container. With the clamp it is again assured that for storing, transport and removal the container contents cannot reach the space between the container inner wall and the outer surface of the inner lining.

In an especially expedient embodiment it is provided that the sealing element is arranged on a circular front surface of the outlet connection, that a closure stopper which is preferably designed as an outlet valve and is provided with a flange is inserted into the hose-like projection that is located in the outlet connection and with its flange in an intermediate position between another seal the closure stopper presses the edge region of the hose-like projection against the sealing element and the clamp grabs around the flange and the edge of the outlet connection. An error-free seal of the container inner space against the uncontrolled exit of portions of the container content is assured through this arrangement.

The invention is explained more closely through the schematic drawings of an embodiment.

Figure 1 shows a vertical cut through a container equipped with a removable inner lining,

Figure 2 shows the embodiment of the outlet opening in a cut and in an enlargement.

A container 1 is represented in Figure 1, said container is produced in a blow-molding extrusion process from high molecular weight polyethylene and thus is permeable for a series of substances. The container has a filling connection 2 and an outlet connection 3. The outlet connection 3, in the represented embodiment, is produced separately, as a plastic molded piece and is welded to the container 1. The filling connection 2 can be tightly closed through a closure cover 4 that can be screwed on.

A sack-shaped inner lining 5 made of a sealed film material is fed into the container 1, the inner lining is equipped in the area corresponding to the filling connection 2 with a hose-like projection 6 and is equipped in its area corresponding to the exit opening, which is defined by the outlet connection 3, with a hose-like projection 7. The sack-shaped inner lining 5 which in its shape fits to the inner contour of the container 1 is fed in through the filling connection 2 into the container inner space and is blown up through a compressed air configuration until the inner lining lies up against the inner wall of the container 1. The inner lining in Figure 1 is represented, due to its simpler graphical representation, in an intermediate stage. When in use the inner lining lies tightly up against the inner wall of the container 1. The hose-like projection 7 is pulled out through the exit connection 3 and attached to the exit connection, as is described more closely through Figure 2.

The hose-shaped projection 6 is equipped with a reinforcing ring 8 at its free end, whose outer diameter is larger than the open width of the fill opening which is defined by the filling connection 2 such that this reinforcing ring, on the one hand, secures the inner lining 5 that has been fed into the container 1 and on the other hand functions at the same time as a primary seal in collaboration with the closure cover 4.

The exit connection 3 which is represented in Figure 2 in a partial cut at an enlarged scale has a flange 9 on its free end, said flange is equipped with a groove 11 on its front surface 10, a sealing element 12 is held in this groove where the sealing element is made out of an elastic material, for example an O-ring. The hose-shaped projection 7 is pulled through the exit connection and in a ring shape folded up against the front surface 10 with its free end. Through a corresponding shape formation of the free end during the production of the inner lining, for example through the formation as a funnel-shaped extension, a flat installation can be achieved here. Subsequently, a flat seal 14 is laid upon the folded-up edge 13 and a closure stopper 15, which is preferably designed as an outlet valve, is shoved into the hose-shaped projection 7. A flange 16 placed on the closure stopper 15 presses here the flat seal against the collar 13 and this correspondingly against the sealing element 12. The pressing force is applied through a clamp 17, for example a screw bracket, which securely connects the flange 16 of the closure stopper 15 to the flange 9 of the exit connection 3.

In the representation according to Figure 2 the parts that are inserted into each other are represented with a separation to each other because of the desire to create a better overview representation, this separation is not the case in practice.

If this type of container should be disposed after being emptied, then the clamp 17 is loosened, the closure stopper 15 is pulled out and the free end of the hose-shaped projection 7 is closed, for example, by pinching off. Subsequently, the inner lining 5 can then be pulled through the fill connection 2 without that residue of the contents still contained in the inner lining can reach the inner space of the container. Because the inner lining is made of a film material, this can be

correspondingly compromised and it is easier to dispose of than a complete container. The container can be used again by setting in a new inner lining.

The choice of the film material is directed essentially towards the substances to be filled such that for example films with improved permeation properties, that means substantially diffusion-tight films, are employed. The invented container can, however, also be used for flowable substances which tend to deposit and/or accumulate on the container wall. By disposing the inner lining the container is capable of being used again without extensive cleaning. Here, in most of the cases one only needs to pay attention that the film has sufficient mechanical durability.

Title: Container for flowable substances with releasable inner lining

Claims:

1. Container for storing and/or transport of flowable materials with a reclosable opening for filling and a reclosable outlet orifice, said container is equipped with a removable sack-shaped inner lining made of a thick film material is characterized in that at least the outlet opening is formed by an outlet connection (3) that is outwardly directed and that the sack-shaped inner lining (5) is provided with a hose-type projection (6, 7) both in the area of the filling opening and in the area of the outlet opening, said projection is fed each to the outer side of the container (1) and is secured to the outside in a sealed manner.
2. Container according to claim 1 is characterized in that the hose-like projection (6) of the inner lining (5) that belongs to the fill opening is tightly connected on its free end to a reinforcing ring (8) whose outer diameter is larger than the open width of the fill opening and the projection can be tightly sealed with the closure (4) of the fill opening.
3. Container according to claim 1 or 2 is characterized in that the hose-like projection (7) of the inner lining (5) that belongs to the outlet opening is designed to be able to be laid at least over the free front surface (10) of the outlet connection (3).
4. Container according to one of the claims 1 to 3 is characterized in that the outlet connection (3) is provided with a sealing element (12) in the area of its free end where the sealing element goes around the outlet connection and that clamps (17) are provided which press the outer surface of the hose-like projection (7) against the sealing element (12).
5. Container according to one of the claims 1 to 4 is characterized in that the sealing element (12) is arranged on a circular front surface (10) of the outlet connection (3), that a closure stopper (15) which is preferably designed as an outlet valve and is provided with a flange (16) is inserted into the hose-like projection (7), with the flange (16) in an intermediate position between another seal (14) the closure stopper presses the edge region (13) of the hose-like projection (7) against the sealing element (12) and the clamp (17) grabs around the flange (16) and the edge (9) of the outlet connection (3).